

09/995,128

## REMARKS

Claims 1-12 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Takeda et al. '612 in view of Jongsma '342. The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the following remarks.

As the Examiner is aware, in order to properly support an obviousness rejection under 35 U.S.C. § 103(a), the combined references must provide some disclosure, teaching or suggestion which would lead one of skill in the art to combine the references as alleged by the Examiner. While the references arguably determine or measure a 3-dimensional surface, the reference methods are each particularly different.

Takeda et al. '612 discloses a method of determining a three-dimensional shape by obtaining an image of a two-dimensional grid deformed according to the 3-dimensional features of the object being determined or measured. A light source 4 provides a single color light through the 2-dimensional grid 1. As is readily understood by those of skill in the art, due to the use of a 2-dimensional grid 1, the lines of the grid intersect with one another and create substantial noise in the measurement system at these cross points.

Contrary to Takeda et al. '612 and the single two dimensional grid disclosed therein, in Jongsma '342, two separate 1-dimensional grids (or slides 4) are used for three-dimensional shape measurement. The left-right separation of the projectors and grids is critical in Jongsma '342 to ensure that any information missing in one image from one projector and grid, can be supplemented through the other image from the other projector and grid. This is important in Jongsma '342 due to the necessity to capture or freeze the rapid eye movements of a patient's eye where the cornea surface is being measured or mapped.

Thus, one of skill in the art could not combine Jongsma '342 with a single, 2-dimensional grid as in Takeda et al. '612 to achieve any desired effect of capturing rapid eye movement. On the other hand, There is no disclosure, teaching or suggestion in Takeda et al. '612 which would lead one of skill in the art to use anything other than a single light source and 2-dimensional grid. In fact, Takeda et al '612 could not use anything other

09/995,128

than a single light source and thus using two gratings of different colors as disclosed in Jongsma '342 not only teaches explicitly away from the single 2-dimensional grid of Tameda et al. '612, but in fact is impossible in such a 2-dimensional grid arrangement.

Even if the above discussed references are combinable, and the Applicant adamantly believes that they are not, a combination of the references would still fail to disclose the features of the presently claimed invention.

In contrast, there are no cross-points, in the present invention, formed by lines with the same color because lines with the same color do not cross over with each other.

In the present invention, a three-dimensional shape is measured not by using two-dimensional grids, but three, one-dimensional grids, each grid with a different color, direction and period. According to the present invention, plural one-dimensional grids with different periods and directions are arranged. Colors are changed for each one-dimensional grid and projected on an object to be measured with one-dimensional grid patterns overlapped at the same time. The grid patterns deformed in accordance with the three-dimensional shape of the objects are imaged. The grid image separates into components of one-dimensional grids of different colors. Phases for each component of the one-dimensional grids are detected. The measurement value is obtained on the basis of the detected phases. Accurate measurements can be achieved because noise caused by overlapping of grid images is reduced since there isn't any cross-over in grid images separated into respective colors.

In order to clarify the present invention the Applicant has slightly amended each independent claims 1, 11 and 12 to specifically recite ".....the grid patterns comprising at least three one-dimensional grids of different colors.....". At least this feature is not disclosed, taught or suggested by the cited references either alone or in combination and therefore the Applicant respectfully requests withdrawal of the obviousness rejections. As the remaining claims depend from claim 1 which is believed allowable in view of the above remarks and amendments no further discussion is provided.

09/995,128

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

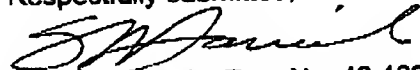
In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejection(s) should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the Takeda et al. '612 and Jongsma references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



Scott A. Daniels, Reg. No. 42,462

Customer No. 020210

Davis & Bujold, P.L.L.C.

Fourth Floor

500 North Commercial Street

Manchester NH 03101-1151

Telephone 603-624-9220

Facsimile 603-624-9229

E-mail: patent@davisandbujold.com

### CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being transmitted via facsimile to the United States Patent and Trademark Office on: July 18, 2003.



Scott A. Daniels

Type name of person signing certificate

FAX RECEIVED

JUL 18 2003

TECHNOLOGY CENTER 2800